WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

By EDWARD H. BOWIE, in charge of Forecast Division.

Deep barometric depressions were observed in the region of Iceland and the British Isles from the 1st to 5th, followed by an exceptionally rapid rise to abnormally high pressure in the latter region from the 3d to 5th; another depression of pronounced character covered these regions on the 9th to 11th, following which date the pressure was near or above the normal until the close of the month. Low pressure prevailed after the 20th over southern Europe, and on the 24th and 25th a decided *fall set in and a storm* of hurricane intensity prevailed over the Mediterranean Sea. Over the Eurasian Continent, well-defined storm areas passed eastward from the 6th to 12th and the 19th to 25th. An area of low barometric pressure of great magnitude covered Siberia on the 17th and 18th. The area of high barometric pressure over the middle latitudes of the Atlantic Ocean was of less than normal development, except during the first week of the month. In the Bering Sea area pressure was below normal from the 1st to 6th, 12th to 16th, 19th to 25th, and 27th and 28th, and near or above the normal during other parts of the month.

In the United States the temperature averaged near or above the normal in all districts, the only extensive cold wave occurring from the 27th to 30th, when freezing temperatures prevailed nearly to the Gulf coast and killing frost occurred in all interior districts east of the Rocky Mountains and light frost as far south as northern Florida. The month, as a whole, was one of much sunshine, favorable temperature, and sufficient rain, although droughty conditions continued in portions of the Middle Atlantic and New England States and over the Great Plains from Texas to North Dakota. Excessive rains occurred over the Southeastern States and in the Ohio and middle Mississippi valleys.

The month opened with continued low pressure over the Bering Sea area and its extension southeastward into Alberta, Canada. Warm and generally clear weather prevailed over the United States, except on the north Pacific coast, where there was rain.

The following special forecast was issued Sunday, October 2:

An extensive barometric depression from Alaska has overspread the interior of the West, and its eastward movement will be attended by rains that will cover the Northwest Sunday and Sunday night, extending Monday and Tuesday over the greater portion of the corn belt and the upper Lake region, Tuesday and Wednesday over the Ohio Valley and the lower Lake region, and Wednesday or Thursday over the Middle Atlantic States and New England. The rains will probably not be prolonged beyond one day over the districts affected, and no other rains of consequence are indicated during the week, except in the Northwest, where another period of low pressure and unsettled weather is likely to set in after the middle of the week. The week will open with higher temperature in the Ohio and Mississippi valleys and by Tuesday the warm weather will reach the Eastern States. There will be a return to somewhat more seasonable conditions after the indicated rains, but, on the whole, temperature over the country will be above the normal during the week.

A disturbance that was crossing the Caribbean Sea during the last week of September entered the Gulf of Mexico by way of the Yucatan Channel on October 1, following which date this disturbance persisted for a number of days as a shallow depression over the Gulf of Mexico, and gave rise to heavy rains along the Gulf and south Atlantic coasts. The western disturbance advanced eastward as forecast and the morning of the 3d it was charted as a trough of low pressure extending from the upper Lake region southward to Texas, attended by showers. On the 4th the area of low pressure extended from the Great Lakes southward to the west Gulf States and rains were falling in the upper Lake region and the Mississippi and Ohio valleys. Very heavy rains fell on that date, the 4th, in the lower Ohio Valley, and high temperatures for the season continued in the eastern districts. This disturbance continued to move slowly eastward and reached the Atlantic coast on the 6th, causing rains that materially relieved the droughty conditions over the greater portion of the Atlantic coast region. Following this disturbance, there was a secondary development over the Gulf of Mexico and rains continued until the close of the week in the South Atlantic and east Gulf States. High temperatures preceded these rains in the Eastern States, but these gave way to much colder weather on the 7th, when cool weather was general except in the Northwest. There were frosts the morning of the 6th in the Plains States and the upper Mississippi Valley and on the 7th and 8th over the Lake region, New York, and New England.

The following forecast for the week beginning the 10th was issued on the 9th:

The prevailing high pressure over the interior districts east of the Rocky Mountains indicates that clear weather will predominate over the eastern half of the country during the coming week, except in the South Atlantic and east Gulf States, where showery weather will continue for a day or two owing to unsettled conditions over the Gulf of Mexico. Moderate temperature will rule, with, however, a rising tendency after the middle of the week.

Alaskan observations are missing, but Saturday's observations, coupled with the present pressure distribution over the Northwest, presage a week of generally fair weather over the West, although with some possibility of unsettled conditions Monday or Tuesday in the extreme Northwest, accompanied by falling temperature. Over the Central West it will be somewhat warmer early in the week, followed by a change to cooler weather after Wednesday.

Generally fair weather prevailed during the week, beginning the 10th until the 16th in the districts east of the Rocky Mountains except in the Southern States, where there were rains beginning on the 12th; west of the Rocky Mountains, rains occurred generally from the 11th to 13th, followed by fair weather.

THE WEST INDIAN HURRICANE OF OCTOBER, 1910.

Although the pressure was below the normal several days previously to the 12th over the Caribbean Sea, the first intimation of a disturbance of decided intensity in that region was received by wireless telegraph the evening of the 12th from the steamship *Abangarez*. This report read as follows:

Steamship *Abangarez*, bound south, midnight of 11th, weather threatening, wind variable, northeast to northwest; heavy rain; barometer 29.40 (?) and falling. 3 a. m., barometer 29.38, heavy rain squalls from west-southwest, hurricane force. 4 a. m., barometer 29.30, rising, wind west-southwest, force 11. 8 a. m., barometer 29.50, wind steady with rain, west-southwest, force 1. Latitude midnight, 15° 4′ north, and longitude, 82° 5′ west. 8 a. m., latitude, 14° 20′ north, and longitude, 81° 51′ west.

This observation, coupled with those from the West Indian stations, located the disturbance very exactly. By the morning of the 13th this storm had advanced northwestward and was apparently central about 200 miles south-southwest of Havana moving north-northwest, and the following advisory warning was issued to shipping on the Gulf and Atlantic coasts:

Tropical storm of considerable intensity southwest of Cuba near Yucatan Channel, moving toward Gulf of Mexico. Caution advised for vessels in those waters.

Later in the day northeast storm warnings were ordered for southern Florida. On the morning of the 14th the center of the hurricane was approaching southern Cuba and on the evening of that date, it was apparently central near and northwest of Havana, where at 7 p. m., the pressure was 29.04 inches, with a maximum wind velocity of 88 miles an hour from the south. The conditions on the morning of the 14th were threatening and the storm warnings on the southern Florida coast were changed to hurricane warnings, which were extended northward to include central Florida; and later in the day storm warnings were extended northward to Jacksonville and westward to New

Orleans. The following information was given to shipping interests from Galveston to Boston:

Hurricane in Gulf of Mexico west of Florida Keys and north of western Cuba, moving north-northwestward. Movement of storm will be attended by dangerous gales. Storm apparently of great energy and wide extent. Vessels bound for danger zone should be fully advised.

Vessel masters were advised by all means available, including the dissemination of warnings by wireless telegraphy, that the storm was of marked intensity and that it would be unsafe for them to venture into the Gulf of Mexico and Cuban waters.

During the 15th and 16th the center of the hurricane apparently moved northwestward over the Gulf and the winds over Cuba and Florida moderated, although still high and the pressure rose somewhat. Wireless observations from vessels during these days showed high winds over the Gulf of Mexico and press reports were to the effect that phenomenally high tides wrought considerable destruction to property on the south shores of the Gulf of Mexico on the 15th and 16th. On the 16th the center of the disturbance was apparently a considerable distance west of Key West and losing intensity; warnings were continued, however, on the east coast of the Gulf of Mexico and on the Atlantic coast northward to Savannah.

A second fall in pressure set in over the western Caribbean Sea on the 16th, and on the night of that day another storm of greater intensity than that which immediately preceded it passed northward over Cuba, attended by the destruction of much property and the loss of a number of lives. At 1 a. m. of the 17th hurricane warnings were ordered displayed by the observer at Key West, and later at 9:30 on the morning of the 17th hurricane warnings were extended to all of Florida, except west of the Apalachicola River, also northward on the Atlantic coast to Norfolk. The following cautionary advice was sent to all other Atlantic and Gulf ports:

A tropical disturbance of great intensity is centered this morning close to and west of Havana. This storm is probably a different one from the storm which reached the east Gulf region last Friday. The earlier one apparently having moved westward into the Gulf of Mexico. Dangerous gales reaching hurricane force are indicated for the east Gulf region and the southern portion of the South Atlantic during the next 24 hours. All vessels should be fully advised.

The center of this storm passed over or near Key West during the afternoon of the 17th and continued to move in a northerly direction until it reached southern Georgia. Its later path inclined more to the east, and it passed off the coast near Cape Hatteras on the 20th.

This storm was very destructive to property in Cuba and the Florida Peninsula and on the Georgia and South Carolina coasts. A number of vessels at sea, not equipped for communication by wireless telegraphy, were wrecked and a number of lives lost. The warnings issued by the Bureau were timely and resulted unquestionably in saving many lives and much property. A detailed description of the hurricane, and the resulting damage and loss of life therefrom is to be found elsewhere in this number of the REVIEW.

The following are comments made on the work of the Weather Bureau in connection with this storm.

Letter from C. W. Jungen, Manager of the Atlantic Steamship lines of the Southern Pacific Company:

I beg to express to you the appreciation of the management of this company for the valuable service rendered by the Weather Bureau during the tropical storm in the Gulf of Mexico and the Atlantic Ocean on or about the 13th to 19th instant, which overtook several of the company's ships in that vicinity. These bulletins were of great assistance to the masters of our ships in preserving the company's property and preventing the loss of life at sea.

Letter from Senator Duncan H. Fletcher of Florida:

Permit me to say I have always appreciated the value of the Weather Bureau to the country and the service rendered before and during the recent hurricane has further emphasized its indispensability to Florida.

Editorial from Tampa Morning News of October 20:

That there was no loss of life during the storm is largely due to the efficiency of the Weather Bureau in warning mariners.

Extract from a letter dated November 9, from J. R. Brown, President of the Florida East Coast Railway:

I am pleased to express our appreciation of the excellent service rendered by the Weather Bureau through your office during the past season, and the frequent advisory warnings sent down the line during the approach of the recent hurricane. The information thus furnished, I am advised, enabled us to get practically all our large fleet of floating equipment into hurricane harbors, thus making our loss in this respect comparatively light. We were also enabled to get our scattered forces of about 1,500 men into safe locations so that there was no loss of life. By use of hurricane flags, rockets, and signal whistles we were enabled to warn the inhabitants of the keys, the fishing fleet in the locality of our work, as also two steamships anchored at Knights Key Harbor. Had we depended on the barometer we would not have been able to secure one-half of our floating plant before the storm was upon us.

Extract from an editorial in the Florida Times-Union, Jacksonville, Fla., of October 30:

Considering our own State alone, it is impossible to estimate what the weather service has done for Florida. * * * We have recently passed through a storm as severe as any that ever swept this State. Hundreds of men were working on the east coast extension on the Florida keys in the most exposed situation conceivable. The Weather Bureau sent out its warnings and the men went to places of safety and not a single life was lost, where, but for the warnings, thousands would have been drowned. * * *

Editorial from the Chieftain, Pueblo, Colo., October 19:

The modern system of weather reports, predictions, and signals undoubtedly has saved hundreds of lives and millions of property in the recent terrible southern storm.

Editorial from the Savannah, Ga., Morning News of October 26:

Yet it (the storm) might have been worse; and it probably would have been a great deal worse, except for the timely warnings sent out by the Federal Weather Bureau.

Editorial from the Vicksburg, Miss., Herald of October 19:

There can be no question that a grave calamity has befallen Cuba and the Florida Peninsula as well. The one gratifying circumstance in it is the proof furnished of the infinite value of the Weather Bureau warnings, which gave ample time for all shipping to seek shelter in safe anchorage.

From the 10th to the 16th, inclusive, except in the region traversed by the hurricane hereinbefore referred to the weather over the country was generally fair, except in the Pacific States where rains were frequent and caused some damage in the raisin districts of California, although, as stated in an editorial from the California Fruit Grower of October 15, "warnings were received in time and the trays mostly all stacked."

Frosts occurred on the 10th in the upper Lake region and on the 13th in the interior of New England and New York and in northeastern Pennsylvania.

A disturbance developed in the extreme Northwest on Thursday, the 20th, and on the 21st was over the upper Mississippi Valley, whence it moved northeastward across the Great Lakes, attended by brisk south shifting to west winds, and rains from the Mississippi Valley to the Atlantic coast. Advisory warnings of brisk and high winds were issued for the Great Lakes on the 21st, and on the morning of the 22d storm warnings were issued for Ontario and extreme eastern portion of Lake Erie. On the 18th and 19th an extensive area of high barometric pressure formed in the Northwest, from which region it advanced southeastwardly and caused much lower temperatures on these days in the northern Plains States and the Rocky Mountain region and later over the southern Plains, the Mississippi Valley, and the East. Snow fell on the eastern slope of the Rocky Mountains on the 19th and 20th as far south as the Texas Panhandle. On the 21st frosts occurred in the southern Plains States and the interior of the west Gulf States, and on the 22d in the Mississippi Valley, the Lake region, and Ohio Valley, and again in the west Gulf States. On the 21st and 22d frosts extended to the Middle South as far east as the western portion of North Carolina. These were forecast on the mornings of the

20th and 21st. On the 22d frost warnings were issued for the east Gulf States, Tennessee, the Ohio Valley, and the interior of the Middle Atlantic States, and again on the 23d for these regions.

A disturbance appeared in the Northwest on the 23d, was central over the upper Mississippi Valley on the 24th in the lower Lake region on the 25th and off the Maine coast on the 26th, being attended during its eastward movement by rains in the Lake region and the North Atlantic States. This disturbance was followed by the last of a series of low barometer areas, having their origin in a deep depression in Alaska and the Bering Sea area. Its center was in the extreme Northwest on the 25th, over the lower Missouri Valley on the 26th, and over the Great Lakes on the 27th. It was attended by rains in the North Pacific States and over the Northern and Middle States from the Missouri Valley to the Atlantic coast and high winds on the Great Lakes on the 27th, for which storm warnings were issued on the 26th. On the 27th warnings were issued for the Atlantic and Gulf coasts, except southern Florida. This disturbance was followed by a decided rise in pressure and a cool wave appeared in the Northwest on Wednesday, the 26th, which quickly overspread the Plains States and the Rocky Mountain region and the Mississippi Valley during Wednesday night and thence advanced to the Atlantic States, attended by considerably lower temperature. General frosts occurred in connection with this high pressure area, except in central and southern Florida.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	75	− 4	Missouri Valley	63	− 4
Middle Atlantic	75	− 1	Northern slope	61	+ 1
South Atlantic	80	+ 2	Middle slope	54	+ 5
Florida Peninsula	82	+ 2	Southern slope	58	+ 5
East Gulf	74	+ 1	Southern Plateau	43	+ 1
West Gulf	68	− 4	Middle Plateau	52	+ 3
Ohio Valley and Tennessee	73	+ 2	Northern Plateau	56	+ 7
Lower Lakes	75	+ 1	North Pacific	84	+ 4
Upper Lakes	78	0	Middle Pacific	65	+ 5
North Dakota	69	− 3	South Pacific	68	+ 2
Upper Mississippi Valley	72	+ 1			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Block Island, R. I.	23	54	nw.	Nantucket, Mass	27	54	sw.
Do	26	50	nw.	New York, N. Y	23	50	nw.
Buffalo, N. Y	27	60	w.	North Head, Wash	2	76	se.
Canton, N. Y	27	60	sw.	Do	3	72	se.
Charleston, S. C	18	52	e.	Do	4	62	se.
Do	19	68	e.	Do	16	56	se.
Cleveland, Ohio	27	54	w.	Do	17	62	se.
Jacksonville, Fla	18	56	ne.	Oklahoma, Okla	26	50	n.
Jupiter, Fla	17	58	se.	Point Reyes Light, Cal.	1	72	nw.
Do	18	70	s.	Do	2	52	nw.
Key West, Fla	14	50	se.	Do	4	60	nw.
Do	17	100	s.	St. Paul, Minn	18	50	sw.
Do	18	60	sw.	Savannah, Ga	18	60	e.
Memphis, Tenn	13	72	sw.	Do	19	70	ne.
Mount Tamalpais, Cal.	1	72	nw.	Tatoosh Island, Wash.	5	53	s.
Do	3	54	nw.	Do	6	60	s.
Do	4	54	nw.	Do	7	63	se.
Do	17	52	nw.	Do	8	63	se.
Do	18	50	ne.	Do	26	56	ne.
Mount Weather, Va	25	52	w.	Do	27	60	ne.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	52.5	+ 2.0	+15.4	+ 1.5
Middle Atlantic	15	58.1	+ 2.7	+13.8	+ 1.4
South Atlantic	10	66.6	+ 2.9	+ 7.2	+ 0.7
Florida Peninsula*	8	73.0	+ 0.3	− 2.2	− 0.2
East Gulf	11	67.8	+ 2.1	0.0	0.0
West Gulf	10	67.1	+ 0.8	+ 9.4	+ 0.9
Ohio Valley and Tennessee	13	60.4	+ 3.3	+ 5.2	+ 0.5
Lower Lakes	10	53.5	+ 1.9	+ 8.6	+ 0.9
Upper Lakes	12	51.2	+ 3.6	+22.2	+ 2.2
North Dakota*	9	49.5	+ 5.2	+27.3	+ 2.7
Upper Mississippi Valley	14	56.6	+ 3.7	+13.8	+ 1.4
Missouri Valley	11	57.8	+ 4.7	+20.0	+ 2.0
Northern slope	10	49.8	+ 5.1	+24.7	+ 2.5
Middle slope	6	58.8	+ 3.2	+21.0	+ 2.1
Southern slope*	8	62.8	+ 0.6	+15.9	+ 1.6
Southern Plateau*	12	51.0	+ 1.5	+16.0	+ 1.6
Middle Plateau*	10	49.8	+ 1.7	+14.5	+ 1.4
Northern Plateau*	9	51.2	+ 2.6	+11.0	+ 1.1
North Pacific	7	52.4	+ 1.3	− 1.6	− 0.2
Middle Pacific	5	61.2	+ 1.7	− 2.4	− 0.2
South Pacific	4	65.5	+ 3.2	+12.8	+ 1.3

*Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		Inches.	Inches.
New England	11	1.90	53	− 1.7	− 5.7
Middle Atlantic	15	3.20	100	0.0	− 4.5
South Atlantic	11	2.96	100	0.0	− 5.3
Florida Peninsula*	8	10.00	208	+ 5.2	− 5.1
East Gulf	11	3.46	135	+ 0.7	− 5.5
West Gulf	10	3.31	122	+ 0.6	− 5.4
Ohio Valley and Tennessee	13	4.23	161	+ 1.6	+ 1.0
Lower Lakes	10	3.46	117	+ 0.5	− 1.3
Upper Lakes	12	2.28	79	− 0.6	− 5.5
North Dakota*	9	0.44	47	− 0.5	− 6.6
Upper Mississippi Valley	15	1.82	75	− 0.6	− 7.4
Missouri Valley	11	1.08	55	− 0.9	− 3.5
Northern slope	9	0.67	69	− 0.3	− 2.8
Middle slope	6	0.47	30	− 1.1	− 6.4
Southern slope*	8	1.62	84	− 0.3	−10.1
Southern Plateau*	12	0.39	49	− 0.4	− 2.9
Middle Plateau*	11	1.32	143	+ 0.4	− 3.3
Northern Plateau*	9	1.16	100	0.0	− 2.4
North Pacific	7	4.73	117	+ 0.7	− 3.2
Middle Pacific	7	0.51	36	− 0.9	− 7.1
South Pacific	4	0.73	89	− 0.1	− 4.8

*Regular Weather Bureau and selected cooperative stations

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.3	− 0.1	Missouri Valley	3.0	− 1.1
Middle Atlantic	4.1	− 0.7	Northern slope	4.2	− 0.2
South Atlantic	3.4	− 0.6	Middle slope	3.0	− 0.4
Florida Peninsula	5.4	+ 0.7	Southern slope	3.3	− 1.3
East Gulf	3.7	− 0.2	Southern Plateau	2.2	0.0
West Gulf	3.1	− 0.6	Middle Plateau	3.2	− 0.1
Ohio Valley and Tennessee	3.7	− 0.7	Northern Plateau	4.8	+ 0.2
Lower Lakes	5.1	− 0.8	North Pacific	7.3	+ 1.0
Upper Lakes	5.4	− 0.6	Middle Pacific	4.1	+ 0.3
North Dakota	4.6	− 2.6	South Pacific	2.8	− 0.3
Upper Mississippi Valley	3.5	− 1.1			